

2. Object-glasses and mirrors not to be unscrewed from their cases till telescopes are perfectly mounted.

*Precautions to be attended to half an hour before Totality.*

1. If an aperture has been reduced for preliminary experiments, take care that full apertures are restored.

2. In case any telescopes are used for eye observations, reminder should be given to take off dark glasses before totality.

3. Wind up all clocks.

4. Let all strangers withdraw.

5. Light lamps.

#### *Arrangement of Photographic Plates.*

As the plates are smaller than was intended, the spectrum must be thrown along the length of the plate, and if possible, in the prismatic cameras, from corner to corner.

A shelf should be prepared over the developing table with places marked 1, 2, 3, &c. The backs used in any one instrument should be labelled in large letters on both sides, and a similar label should distinguish each shelf. The plates will then arrange themselves into series, and can be numbered afterwards. Care must be taken to have lamps in the dark room.

#### *The Time Teller.*

One person should be detailed at each station to tell the time.

The chief observer at each station will give the signal for commencement for totality, which being done, the time assistant will call out the number of seconds of calculated duration at the locality. If, for instance, the totality is four minutes, he will say "You have 240 seconds," and go on calling out every ten seconds the number of seconds still left for work. A clever man can do this in a very encouraging way. The time counter should take care not to distract himself by losing sight of the face of the watch or chronometer, and it is to be impressed upon him that much of the success of the observations will depend on his undivided attention, as his statement of time will be an order to the observers to do certain work.

#### *Rehearsals.*

There must be at least two complete rehearsals of the whole attack on two previous days at the time of the eclipse, and the final written instructions to each observer given by the chief of the party will mainly depend on the experience of these rehearsals, which must be of a very serious character. It must be recollected that the speed and skill in collodionising and developing can only be thus determined.

The going of the clocks and counterpoising of telescopes in the particular position in which they will be employed near the time of totality must be examined with the greatest care, and the best regulation of the clock for this position should be adhered to. In these rehearsals all apertures must be reduced.

The clock weights must also be examined, and increased if necessary to produce a uniform motion of the telescope.

#### *Silence.*

Silence must only be broken by the timekeeper. The rehearsals should be utilised for asking any questions touching any part of the duties of each observer during the observations, and each observer should have his programme of work nailed up where it can be easily seen.

In order to prevent noise and interruptions, none but the observers and trained assistants should be allowed to be within fifty yards of the observatories, for an hour before and an hour after totality.

#### *Programme of Work.*

The Programme of Work may conveniently be stated in the time called out by the time observers. In which

case "200 seconds more," and so on, will become an instruction to one of the observers to do a particular piece of work.

#### *Notes on the Phenomena Observed.*

Anything an observer has to record should be done immediately after totality, or the last observation after totality.

Trust nothing to memory; a note made the next day will be comparatively valueless.

#### *Multiplication of Results.*

As soon as convenient after the eclipse, before leaving the station, at least four copies of every photograph must be made, and enlargements, if possible, in duplicate on glass. Paper copies of these duplicates should be transmitted by two different mails to the Royal Society. The various copies to be sent home if possible by different mails and different routes. One copy to be left in India and given in charge of the chief of the Indian expedition.

#### *Photographs of the Corona.*

It will be very desirable for the observers appointed by the Indian Government to depict photographically the corona as a whole, to take some photographs on plates so placed in the long focus camera (rectilinear lens) that the back of the plate is towards the object-glass and the collodion towards the observer, in order to avoid reflection from the second surface of the glass. Special plate holders will have to be made, and the glass selected as perfect as possible and of nearly the same thickness. Of course the back must be carefully cleaned before the plate is exposed.

#### *Observations to be reduced by the Royal Society.*

It is understood that the observations made by the members of the English Expedition are the property of the Royal Society, by which body they will be reduced. It is hoped that the Indian Government will allow duplicates of the observations taken by the Indian parties to be forwarded to the Royal Society to aid in these reductions, and to enable a general account of the whole attempt to be prepared. The English observers detailed to India will co-operate with the Chief of the Indian station to which they may go, and will assist in carrying out the arrangements in accordance with the foregoing instructions.

All experiments made for the furtherance of the objects of the expedition will be carefully recorded and will be considered the property of the Royal Society.

#### *SCHOLARSHIPS AND EXAMINATIONS FOR NATURAL SCIENCE AT CAMBRIDGE, 1875*

THE following is a list of the scholarships and exhibitions for proficiency in Natural Science to be offered at the several Colleges and for non-collegiate students in Cambridge during the present year:—

*Trinity College.*—One or more scholarships of 100*l.*, and one exhibition of 50*l.* The examination for these will commence on March 30. Further information may be obtained from the Rev. E. Blore, Tutor of Trinity College.

*St. John's College.*—One of the value of 50*l.* per annum. The examination (in Chemistry, Physics and Physiology, with Geology, Comparative Anatomy, and Botany) will commence on April 3, and will be open to all persons who have not completed a term of residence at the University, as well as to all who have entered and have not completed one term of residence. There is a separate examination in Natural Science at the time of the annual College examination at the end of the academical year, in

May; and exhibitions and foundation scholarships will be awarded to students who show an amount of knowledge equivalent to that which in Classics or Mathematics usually gains an exhibition or scholarship in the College. In short, Natural Science is on the same footing with Classics and Mathematics, both as regards teaching and rewards.

*Christ's College*.—One or more in value from 30*l.* to 70*l.*, according to the number and merits of the candidates, tenable for three-and-a-half years, and for three years longer by those who reside during that period at the College. The examination will be on April 6. There are other exhibitions which are distributed annually among the most deserving students of the College. Further information may be obtained of John Peile, Esq., Tutor of the College.

*Gonville and Caius College*.—One of the value of 60*l.* per annum. The examination will be on March 18, in Chemistry and Physics, Zoology with Comparative Anatomy and Physiology, and Botany with Vegetable Anatomy and Physiology. Further information may be obtained from the Tutors. Scholarships of the value of 20*l.* each or more are offered annually for Anatomy and Physiology to members of the College. Gentlemen elected to the Tancred Medical Studentships are required to enter at this College; these studentships are five in number, and the annual value of each is 100*l.* Information respecting these may be obtained from B. J. L. Frere, Esq., 28, Lincoln's Inn Fields, London.

*Clare College*.—One of the value of 60*l.* per annum, tenable for two years at least. The examination (in Chemistry, Chemical Physics, Zoology with Comparative Anatomy and Physiology, Botany with Vegetable Anatomy and Physiology, and Geology) will be on March 16, and will be open to students intending to begin residence in October.

*Downing College*.—One or more of the value of 60*l.* per annum. The examination (in Chemistry, Comparative Anatomy, and Physiology) will be on April 6, and will be open to all students not members of the University, as well as to all undergraduates in their first term.

*Sidney College*.—One of the value of 60*l.* and one of the value of 40*l.* per annum. The examination (in Heat, Electricity, Chemistry, Geology, Zoology and Physiology, and Botany) will be on April 6, and will be open to all students who intend to commence residence in October.

*Emmanuel College*.—One of the value of 70*l.* The examination, on March 24, will be open to students who have not commenced residence.

*St. Peter's College*.—One scholarship of the value of from 40*l.* to 80*l.* according to the attainments of the candidate. The examination on April 6 will be in Botany, Chemistry and Chemical Physics, Geology, and Comparative Anatomy and Physiology, but no candidate will be allowed to be examined in more than two of these subjects. Application must be made before March 20 to the Tutor.

*Non-Collegiate Students*.—An exhibition each year is given by the Clothworkers' Company, value 50*l.* per annum, tenable for three years. Examination about Christmas. Information to be obtained from the Rev. R. B. Somerset, Cambridge.

Although several subjects for examination are in each instance given, this is rather to afford the option of one or more to the candidates than to induce them to present a superficial knowledge of several.

Candidates, especially those who are not members of the University, will, in most instances, be required to show a fair knowledge of Classics and Mathematics, such, for example, as would enable them to pass the Previous Examination.

There is no restriction on the ground of religious denominations in the case of these or any of the scholarships or exhibitions in the Colleges or in the University.

Further information may be obtained from the Tutors of the respective Colleges.

Some of the Colleges do not restrict themselves to the number of scholarships here mentioned, but will give additional scholarships if candidates of superior merit present themselves; and other Colleges than those here mentioned, though they do not offer scholarships, are in the habit of rewarding deserving students of Natural Science.

It may be added that Trinity College will give a fellowship for Natural Science, once at least in three years; and that most of the Colleges are understood to be willing to award fellowships for merit in Natural Science equivalent to that for which they are in the habit of giving them for Classics and Mathematics.

The above list shows that Colleges at Cambridge, like those at Oxford, are by no means backward in offering inducements to the study of Natural Science. The scholarships and exhibitions are open to all persons, whether members of the University or not, provided they are willing to enter and become members of the respective Colleges, with the exception of the 100*l.* scholarships at Trinity College, the candidates for which must have passed the Previous Examination at the University.

## NOTES

NEWS has been received from the English Eclipse Expedition dated from Suez: all were well. The *Surat* had been delayed a day by the loss of her screw in the canal, doubtless in that narrow rocky part of the canal some miles above Suez, where so many ships have lost their screws, and the Expedition has proceeded to Galle in the *Baroda*. Arrangements have been made with the Indian Government to have a ship waiting at Galle on the 16th inst. to convey the Camorta party from that place. We publish this week the Instructions to the observers, issued by the Royal Society Committee.

THE Astronomer Royal has communicated the following telegram to the press relating to the Transit of Venus observations at Kerguelen's Land:—"Corbet, Coke, Goodridge observed ingress. Perry good egress. All something. Cloudy. Generally, English photography poor. Americans, Germans lost interior contact. Americans have some photographs."

We have received a letter, dated Jan. 8, from Mr. C. Meldrum, Mauritius, containing the following additional information regarding the transit observations at the Mauritius:—"The new Observatory is seven miles from Port Louis, and by the time the instrument was received and put in place, we were within a few days of the Transit of Venus. You will have heard (I sent you some newspapers by last mail) that owing to the weather, Lord Lindsay and his party, as well as the German Expedition, could only observe the latter half of the Transit, and that they lost the first external and internal contact. Here at this Observatory I had worse weather, the sky being entirely overcast during the greater part of the time. But it so chanced that the weather clearing up for a short time, and the sun appearing, I got the first internal contact just as the sun was emerging from behind a bank of clouds. We had then a long spell of cloudy rainy weather, with occasional glimpses of the sun. Towards the time of second internal contact the weather again cleared up, and I observed that contact under more favourable circumstances than the first internal. On both occasions I saw a dark band or ligament connecting the limbs of the sun and planet, and noted the times of appearance and disappearance. The first internal contact took place some minutes after the computed time, and the second internal contact a little earlier. Our photo-heliograph arrived after the transit. Both Lord